The GIMANAL Program

The GIMANAL program analysis a GIM data base to determine if the records are chained together properly and optionally to determine if items have proper character counts. The errors detected by the GIMANAL program are normally caused by a hardware or software error, followed by some failure in the recovery process that is used after all hardware or software failures.

As the data base is being analyzed for errors, an option exists to generate a DDUMP tape for the data base.* The DDUMP tape is the same format that is generated by a GIM DDUMP PHYSICAL verb and thus may be used as input to the GIM RESTORE PHYSICAL verb or the batch GIM restore program.

The input files for the GIMANAL program are the DD cards that describe the GIM data base. Each extent requires a DD card with the DDNAME of GIMDB01 for the first extent, GIMDB02 for the second and so on. The only DCB information required is DCB=(BUFNO=20,OPTCT=C). This causes the program to use channel chaining to read the data base and thus reduces elasped time. The number of buffers (BUFNO) may be varied. The optimal number is a function of the hardware configuration and device characteristics.

Two output files are possible with the GIMANAL program. The DDNAME of SYSPRINT is used to create a listing with all error messages, boot-strap parameters, data set names of the data base, elasped time and a summary of error messages generated. A maximum of 50 error messages of each type will be printed so that if a large number appear, the summary count on the last page of the listing should be checked for the total number.

The DDNAME of DDUMP is used if a DDUMP PHYSICAL of the data base is desired. The program checks for the presence of a DDNAME equal to DDUMP to see if a ddump is requested. The DCB paramaters, (RECFM=VB, LRECL=703,BLKSIZE=2948,) are coded into the program and thus are not needed on the DD statement.

* We do not use this option, and we are not really sure that it functions correctly.

The JCL to run GIMANAL is:

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//ANAL    JOB  JOB-CARD-ACCOUNTING-INFORMATION
//JOBLIB DD DSN=GIM2.LOAD,DISP=SHR
//GIMANAL  EXEC PGM=GIMANAL,REGION=180K, PARM='/DBSTATS'
//SYSPRINT DD  SYSOUT=A,DCB=(LRECL=133,BLKSIZE=931,RECFM=FBA)
//GIMDB01 DD DSN=PAYROLL.EQCL,UNIT=3330,VOL=SER=123456,DISP=SHR,
//            DCB=(BUFNO=20,OPTCD=C)
//GIMDB02 DD DSN=PAYROLL.EQ02,UNIT=3330,VOL=SER=123456,DISP=SHR,
//            DCB=(BUFNO=20,OPTCD=C)
//**       :
//**       :    A DD CARD IS NEEDED FOR EACH EXTENT OF THE DATA BASE
//**       :
//DDUMP     DD  UNIT=2400,DISP=(NEW,KEEP),LABEL=(1,SL,RETPD=015),
//            DSN=DDUMPDB
```

Region Size

The region size of the job is a function of the size of the overflow area (one bit per record) and the number of buffers specified on the GIMDBxx DD cards. A regions size of 120K will handle a data base with 16,000 overflow records (LASTREC-LOWREC) and BUFNO=20. Decreasing or increasing BUFNO changes the region size by about 700 bytes for each buffer. Thus if BUFNO was increased by 30 to 50, region size would be increased by 22K to 142K.

Completion Code

The GIMANAL program sets a completion code so that a positive check can be made in the JCL for the results of the analysis. Possible completion codes from GIMANAL are:

Completion code	Meaning
0	Program terminated due to abnormal errors by PLI error recovery such as I/O error on tape or disk.
4	Program terminated normally and no errors detected
8	Program terminated normally but detected some unchained overflow records (GA015 message).
12	Program terminated normally but detected errors with data base. (Any message other than GA015)

DBSTATS Option

To cause GIMANAL to perform character count checking in addition to checking chains, include PARM='/DBSTATS' on the EXEC card. This should be done any time there is a question concerning the physical integerity of the data base and regularly scheduled based on update activity. This option will increase CPU time to approximately one to two minutes of CPU on a 65 for each 2314 pack.

DDUMP Option

To cause GIMANAL to generate a DDUMP PHYSICAL tape of the data base, include a DD card for the tape with a DDNAME of DDUMP. DCB information (RECFM=VB,LRECL=703,BLKSIZE=2948) is coded into the program since the online GIM system has a maximum blocksize of 3512. At the completion of the DDUMP, a message with the data set name is printed on the SYSPRINT data set.

Error Messages

GIM Analysis program error messages are described in Appendix A. Phase one reads all records in the prime area and follows each group to the end of its chain. For each overflow record, a bit is set to show that it has been used. If the bit was already set, then an error message is generated. Phase two reads all records in the free area (LOWREC TO BOTTOM OF AVAILABLE SPACE) to make sure each record points to the preceding record. In phase three, the chain of available overflow records (beginning with NEXT AVAILABLE OVERFLOW) is followed until it chains to LOWREC. The bit map of used overflow records is checked to make sure no record is used more than once. The last phase is to check the bit map of overflow records and list out any overflow records that have not been used (GA015 message). If this is the only error message, the data base most likely is in a useable condition. However, the error that caused overflow records to be lost should be found and corrected. The data base should be reallocated to reclaim the lost overflow records.

Message numbers GA001 to GA004, shown with an *, are only generated when the DBSTATS option is included to cause character count checking.

APPENDIX A
GIM Analysis Error Messages

GA001 (*) End of chain found before end of group mark was found. (A chain to zero was found, but end of group mark had not been seen.) Most likely the last item in the group is incomplete. Analysis continues with the next group.

GA002 (*) Neither a five digit charcter count nor an end-of-group mark (°) was encountered following the last item processed. Character count checking for the group is terminated although the chain is followed to the end.

GA003 (*) End of group mark found in an overflow record that does not chain to zero. One or more overflow records are chained to the group but have no data. Analysis continues normally.

GA004 (*) An item does not end with a record mark (°). Character count checking for the group is terminated although the chain is followed to the end.

GA005 A record in the prime area chains to the bottom of available area from the record just before bottom of available. A files prime allocation has overflowed into the free area.

GA006 A group uses the same overflow record more than once in the chain, thus causing an endless loop. Analysis continues with the next group.

GA007 A group uses an overflow record which is also used by another group. (Two or more records point to the same overflow record.) Analysis (with character count checking) continues as long as it is valid.

GA008 An overflow record in a chain, points to an invalid overflow record. (Overflow record must be between LOWREC and LASTREC). Anlysis continues with the next group.

GA009 A prime record chains to an invalid record. Must chain to either the next prime record or an overflow record. Analysis continues with the next group.

GA010 The record at the bottom of available space does not chain to zero. It is the last record in the chain of free records and must chain to zero. Analysis continues with the chain of available overflow.

GA011 A record in the free space area does not point to the record immediately preceding it. All free space records must be chained to the preceding record. Analysis of the free space continues.

GA012 An overflow record, in the chain of available overflow records, points to an invalid overflow record. Analysis of the chain of available overflow is terminated.

GA013 A record in the chain of available overflow records is pointed to more than once thus causing a loop. Analysis of the overflow chain is terminated.

GA014 A record in the chain of available overflow records uses an overflow record which is also used by another group. (Two or more records point to the same overflow record.) Analysis continues of the overflow chain.

GA015 — These overflow records do not appear in any valid group or the available overflow chain and thus are 'LOST' to GIM. (No record points to the record.) These messages are generated after all analysis is completed.

GA016 — A group has more than 50 bad records in a chain. Processing of the group is terminated and continues with the next group.

GA017 — This gives the number of records in the chain of available overflow records. These are overflow records that have been used and turned back to the overflow chain. If this is zero then overflow records are taken from the bottom of free space.

GA018 — This is the number of records in the prime area that have never been allocated to a GIM file.

GA019 — This indicates the DDUMP data set name. The volume serial numbers may be obtained from the JCL.

GA020 — This message is associated with a previous error message (~~GA001~~,GA002,GA003 or GA004). It shows the first 20 characters of the last item seen by the program when the error was detected. It also gives the number of prime records, overflow records, and valid items, read by the analysis program for the group, before the error was found.

* Message generated only when DBSTATS option selected which activates character count checking.